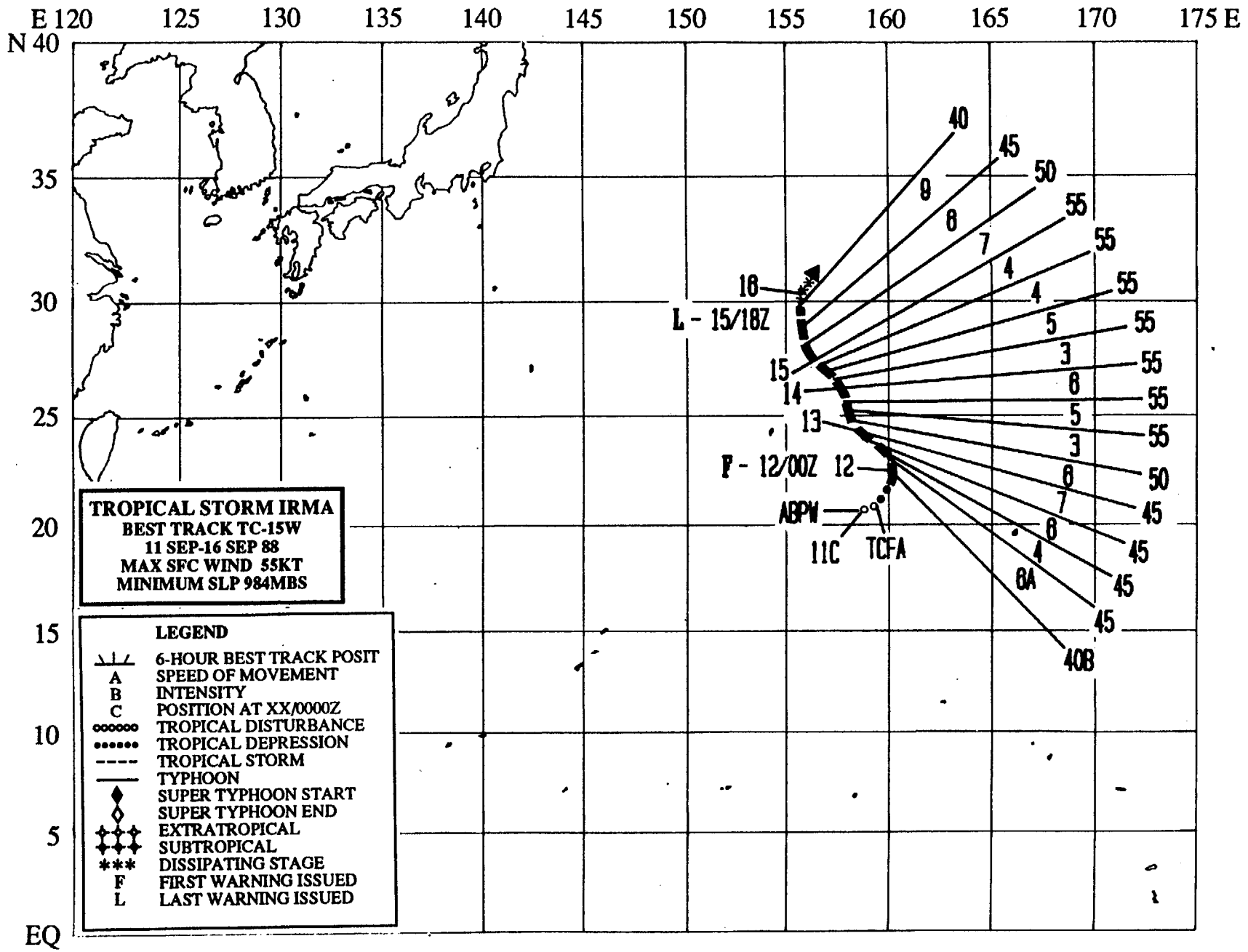
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EQ
TROPICAL STORM IRMA
BEST TRACK TC-15W
11 SEP-16 SEP 88
MAX SFC WIND 55KT
MINIMUM SLP 984MBS
LEGEND
6-HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
*** DISSIPATING STAGE
F FIRST WARNING ISSUED
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16
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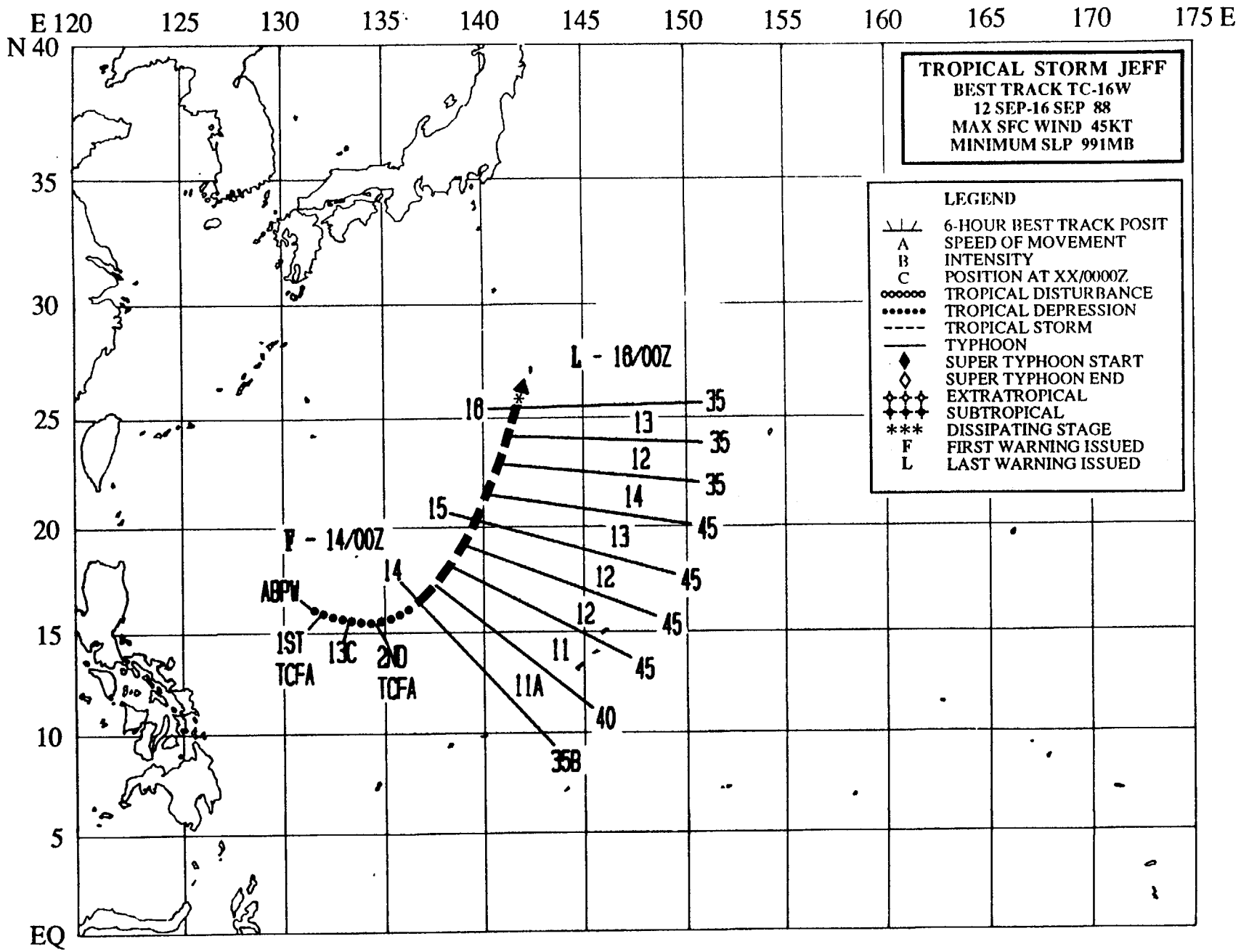
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EQ
TROPICAL STORM JEFF
BEST TRACK TC-16W
12 SEP-16 SEP 88
MAX SFC WIND 45KT
MINIMUM SLP 991MB
LEGEND
6-HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
*** DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
L - 18/00Z
F - 14/00Z
ABPW
1ST TCFA
13C
2ND TCFA
18
15
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11A
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TROPICAL STORM IRMA (15W) AND TROPICAL STORM JEFF (16W)

Irma and Jeff, circulations spawned by enhanced inflow into Typhoon Hal (14W), never achieved typhoon intensity. Both were part of multiple tropical cyclone outbreaks of 12 to 16 September and sheared away when Hal (14W) moved northward through the subtropical ridge.

By the second week of September Hal (14W), which started earlier as a tropical upper-tropospheric trough (TUTT) induced system, had matured south of the subtropical ridge and developed a large supporting low-level southwesterly inflow. (This inflow was separated from, and not the normal eastward extension of, the Asian southwest monsoon.) Jeff formed at the extreme western end and Irma at the extreme eastern end of this southwesterly inflow.

Compared to Jeff, Irma got a head start in central convection and was first noted on the Significant Tropical Weather Advisory at 110000Z. Although the outflow from Hal (14W) to the west streamed across the area, Irma persisted. This increased convective

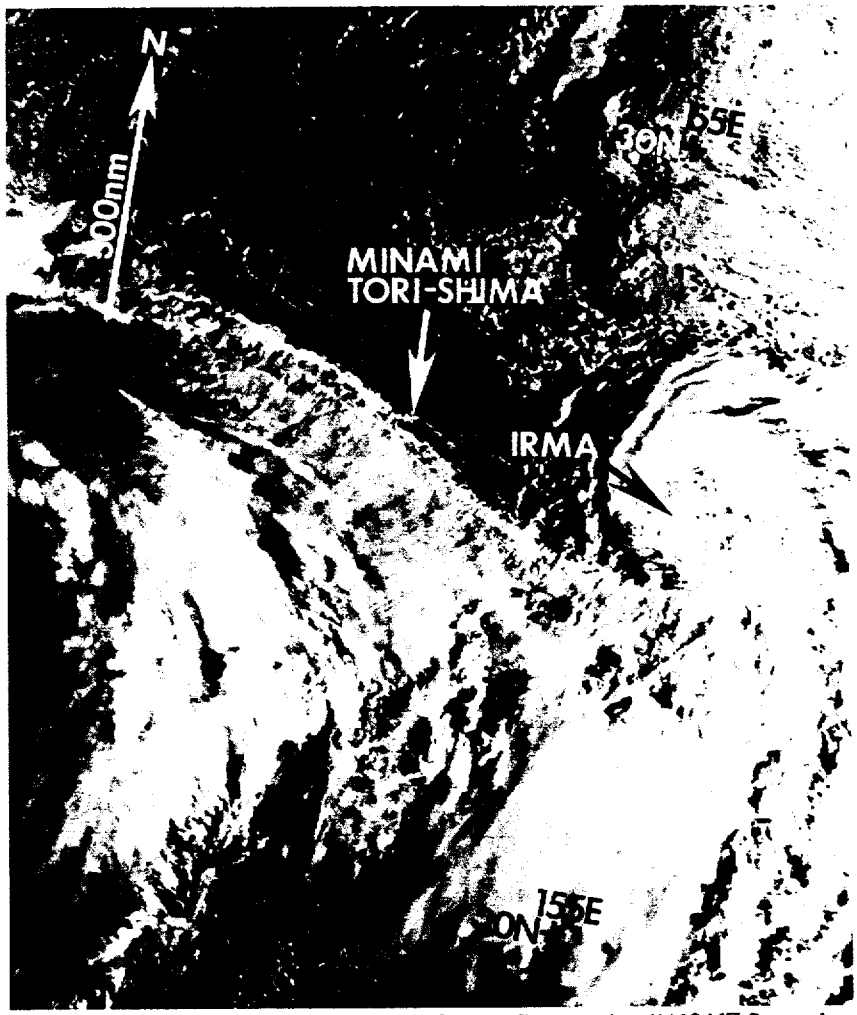

Figure 3-15/16-1. Irma about four hours before the first warning (111946Z September DMSP visual imagery).

activity (Figure 3-15/16-1) required a Tropical Cyclone Formation Alert at 110920Z and a first warning, based on a satellite intensity estimate of 40 kt (21 m/sec), at 120000Z.

Meanwhile, Jeff consolidated and was included on the 120600Z Advisory. Organization of the convection continued and an Alert followed at 121200Z. Another Alert was issued at 131030Z before a 35 kt (18 m/sec) satellite surface wind estimate precipitated the first warning at 140000Z. Jeff's relatively slow development was related to its upper-level outflow being severely restricted in the northeast quadrant by the larger outflow from Hal (14W) to the northeast. This shear in the vertical, in fact, confined Jeff's central convection to the southern half of its low-level circulation for the lifetime of the system.

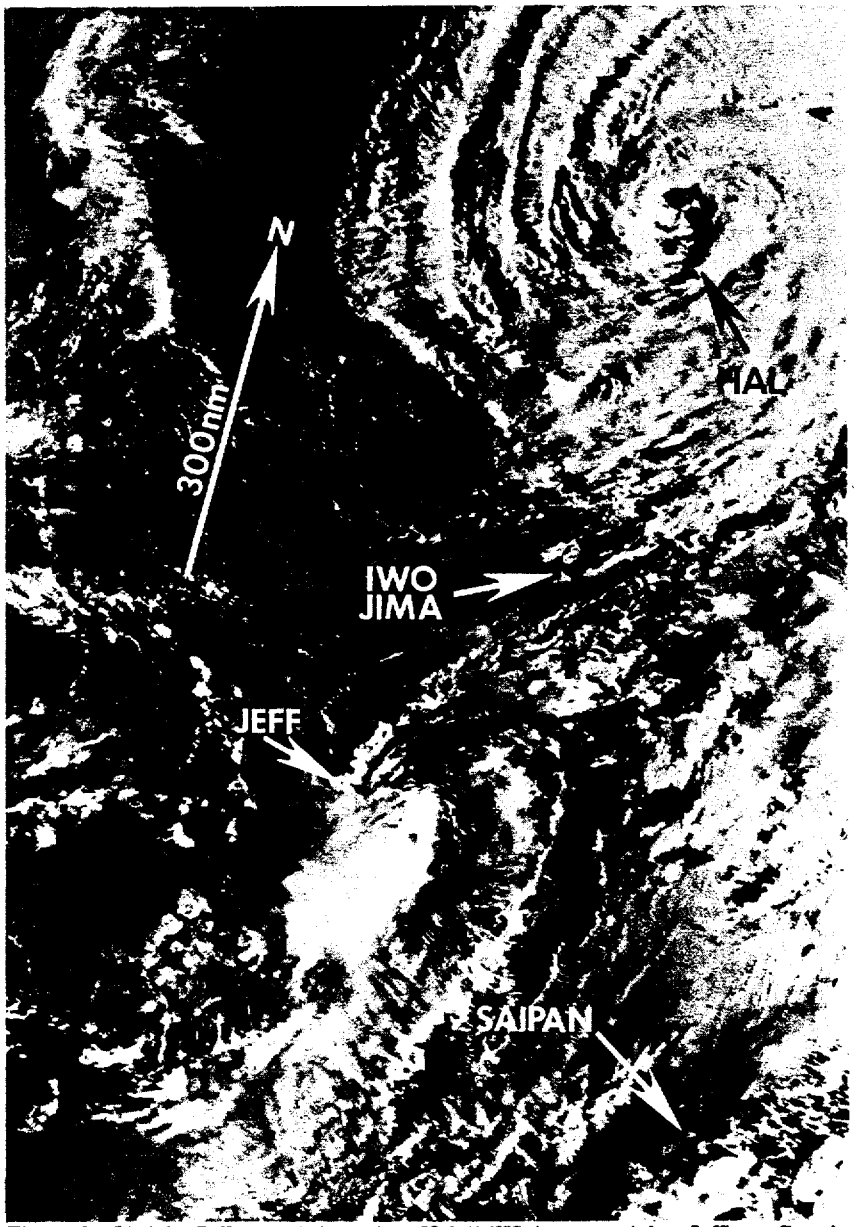

Figure 3-15/16-2. Jeff at peak intensity. Hal (14W) is at top right. Jeff's outflow is severely restricted to the north and east (142051Z September DMSP visual imagery).

Briefly, Jeff (Figure 3-15/16-2) reached a peak intensity of 45 kt (23 m/sec) on 14 September before gradually weakening. In contrast, Irma, which was aided by troughing in Hal's (14W) upper-level outflow, attained 55 kt (28 m/sec) at 131200Z half a day earlier and maintained that intensity through 0000Z on 15 September. Later, both Jeff and Irma were finalled within six hours of each other - Irma (Figure 3-15/16-3) at 151800Z and Jeff at 160000Z - as Hal (14W) moved northward through the subtropical ridge.

The relationship between the three tropical cyclones and the subtropical ridge is of interest. Earlier on 12 September, as Hal (14W) tracked to the north, the subtropical ridge segmented into two cells. These high pressure cells worked to narrow and restrict the low latitude inflow into Hal (14W). This appears to have affected the relative positions between Jeff, Irma and Hal (14W) (Figure 3-15/16-4). Initially, at 130000Z, the baseline (from A to B) between Jeff and Irma is relatively long compared to the height (from C to D) between Hal (14W) and the baseline. However, at

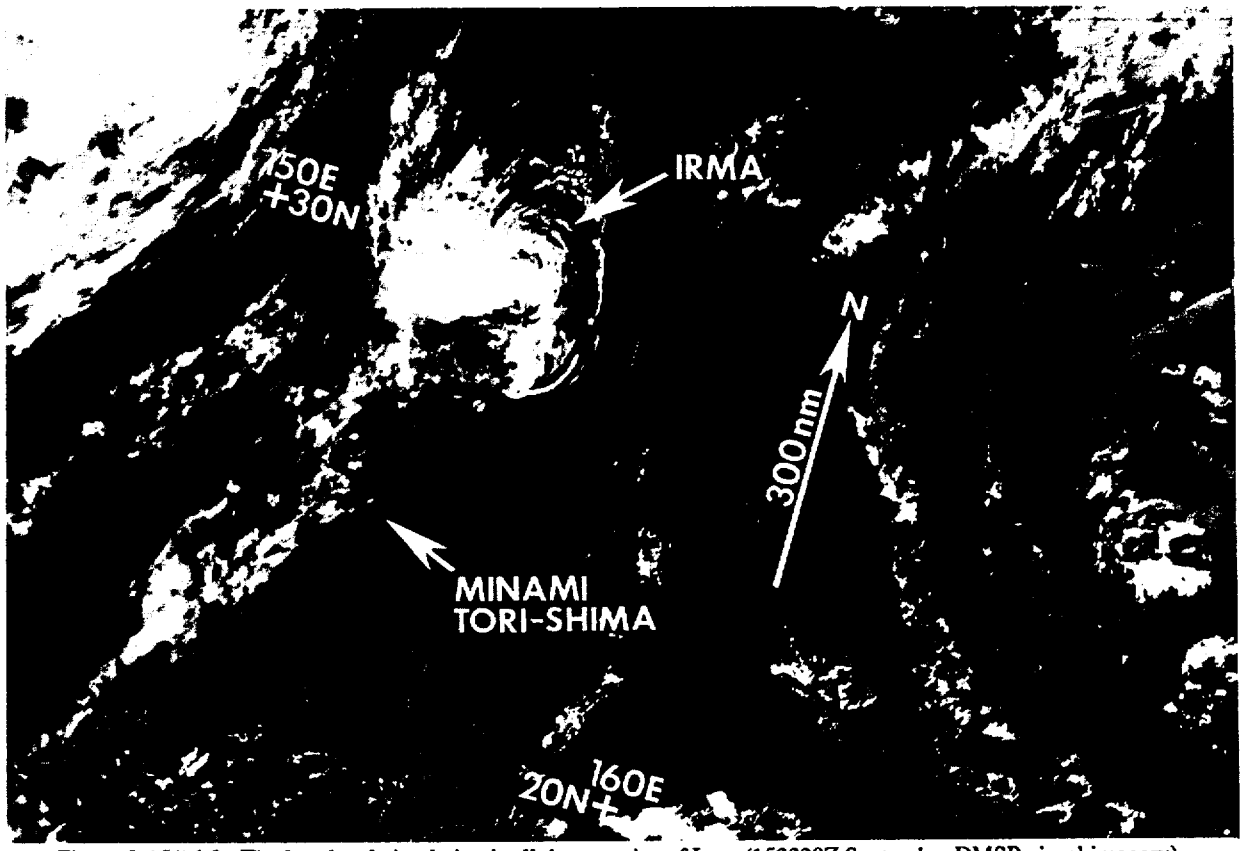

Figure 3-15/16-3. The low-level circulation is all that remains of Irma (152228Z September DMSP visual imagery).

160000Z the baseline has decreased to almost half its previous length and the height has more than doubled. These triangles (Figure 3-15/16-4) suggest a subtle tertiary interaction between Hal (14W) and the two smaller tropical cyclones in an almost non-divergent flow.

This multiple cyclone activity resulted in three sets of warnings being issued from 140000Z to 160000Z. Earlier, from 120000Z to 130600Z, Uleki (01C), Hal (14W) and Irma had required three sets of warnings. No damage reports were received for Jeff and Irma.

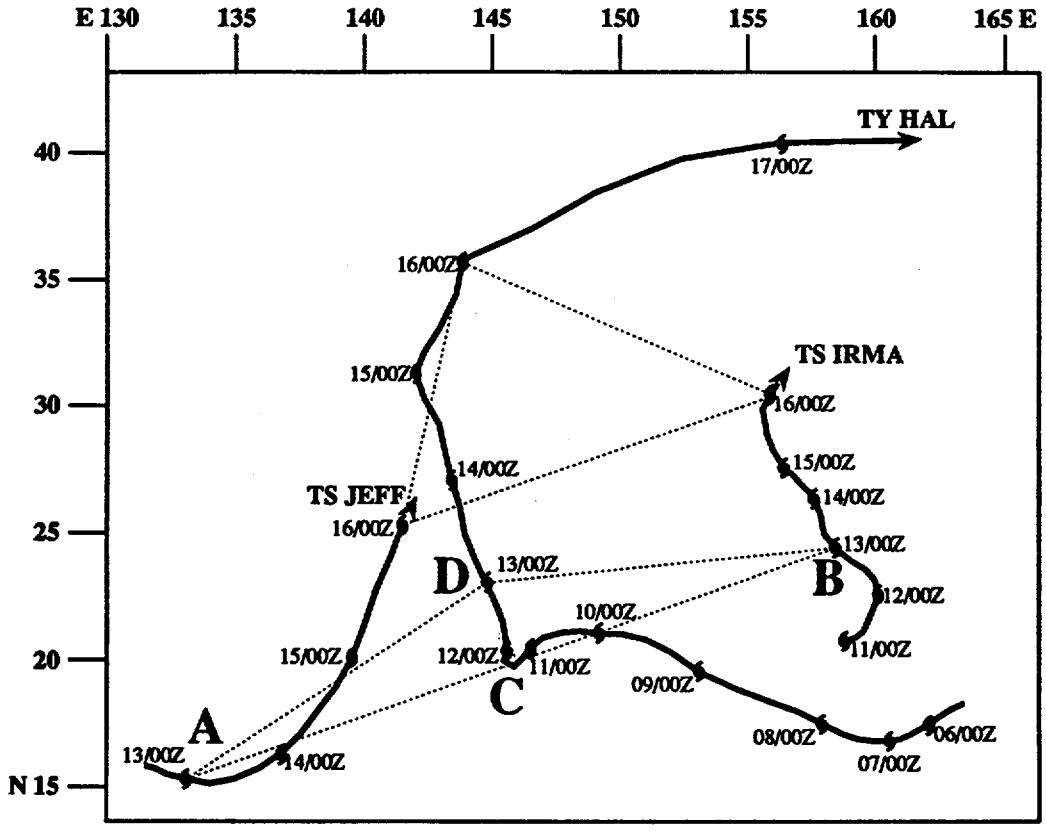

Figure 3-15/16-4. The tracks of Hal (14W), Irma and Jeff. Compare the length of the baseline (from A to B) between Jeff and Irma and the height, which is measured along the vertical (C to D) from the baseline to Hal (14W), at 130000Z with the second triangle at 160000Z. Note the relative adjustment of the three as Hal (14W) moves to the north.